**Properties of carbon compounds**

**1. (i)** The boiling point for methanol is 65ºC and ethanol is 78ºC.

Why does ethanol have a higher boiling point than methanol?

**(ii)** Why are both methanol and ethanol soluble in water?

**2.** Butane and propane are both used as fuel in camping burners. Propane has a boiling point of – 42°C.

**(i)** What state would propane be at room temperature (18°C)?

State whether the boiling point of butane will be higher or lower than propane. Give a reason for your

answer using your knowledge of the structure and properties of alkanes.

**3. a)** Alkanes and alkenes are organic compounds made up of carbon and hydrogen atoms. Name the type of bonding that occurs between the atoms in these organic compounds. Explain your answer.

**b)** Explain how the chemical bonding in alkanes and alkenes affects the way they are used. In your answer:

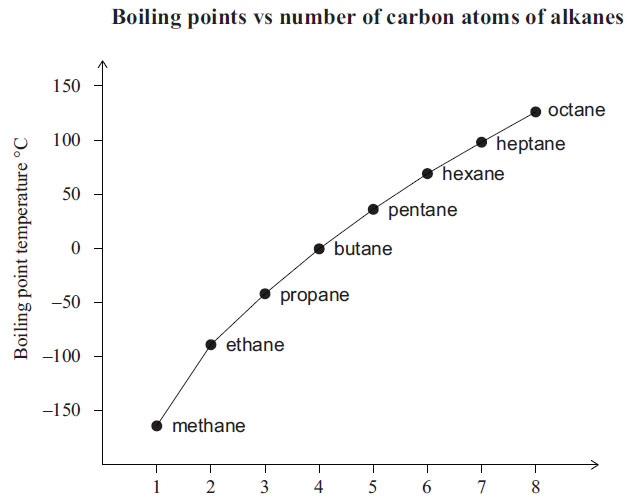
• give the general formulae of alkanes and alkenes

• describe the similarities and differences in chemical bonding

• identify ONE common use for each of alkanes and alkenes

• link the chemical bonding to the property or properties of each type of compound that makes them suitable for the identified use.

**4.** The boiling points of some alkanes are shown in the graph below.



Analyse the trend in boiling points of the first eight alkanes, as shown in the

graph above. In your answer:

• describe the trend

• explain why this trend occurs.

**5.** Identify the type of bonding within a molecule of methanol. Give a reason for your choice.

**6.**  Analyse the differences between ethane and ethanol by considering the similarities and differences of

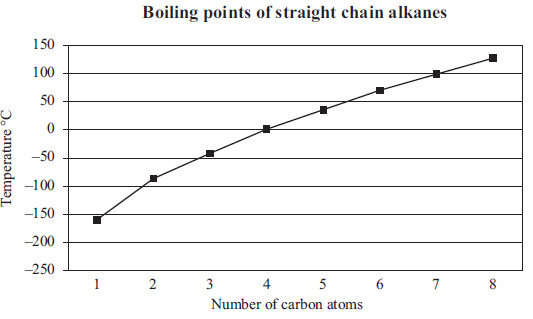
their chemical structures and their physical properties. In your answer include, for both ethane and ethanol:

• their state at room temperature

• their relative melting and boiling points

• their solubility in water.

**7.**



Identify and explain the trend of boiling points for the alkanes shown in the graph above.

In October 2011 a ship, the *Rena*, grounded on a reef near Tauranga Harbour, causing oil to be spilled into

the ocean. It was observed that the oil formed a layer on top of the water, and that it lasted for a long time.

Give an explanation for both observations by referring to the properties of oil.

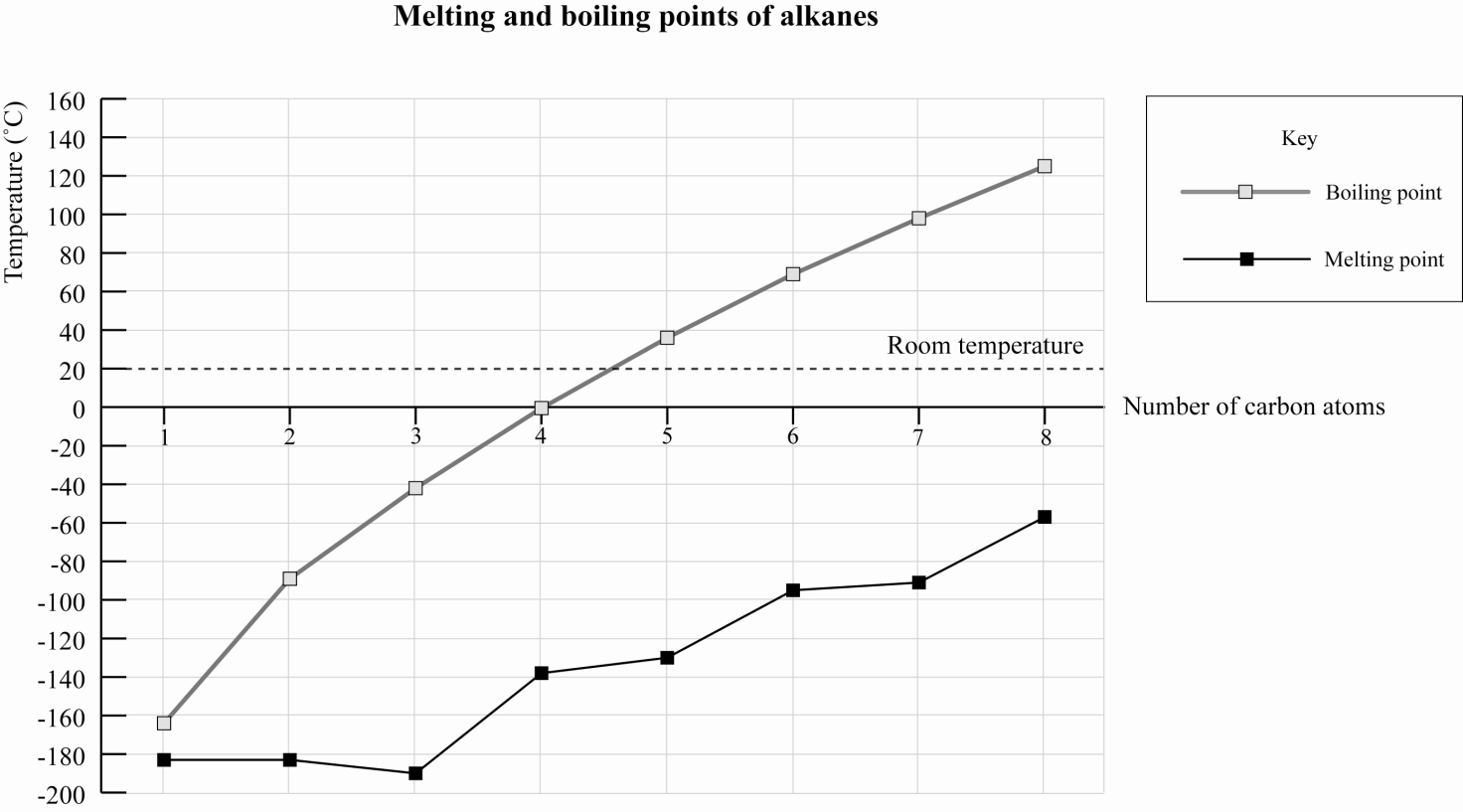
**8.** Hexane and ethanol are organic compounds, which are liquid at room temperature. Using **only** water and a Bunsen burner, explain one chemical AND one physical test that could be used to identify hexane and ethanol. Your answer must include:

• a description of each test

• the observations that would be made for each test for BOTH compounds

• an explanation of the chemical and physical properties of BOTH compounds that allow identification with your tests.

**9.** Melting and boiling points of alkanes



Discuss the trend in the melting and boiling points for the first eight alkanes. In your answer, you should:

define the terms melting point and boiling point

identify the state of the alkanes with three AND with six carbon atoms at room temperature

explain what happens to the particles in a substance when melting and boiling occur

fully explain why both the boiling points and melting points of the first eight alkanes tend to rise as the number of carbon atoms increases.

**10.** The graph below shows the trend of boiling points for the first six alkanes.

|  |  |
| --- | --- |
|  | **Describe** the trend shown in the graph of the boiling points for the first six alkanes and **explain** why this trend occurs. |

**11.** Identify the compound(s) in the table below that would be soluble in water.



**12.** Two of the compounds in the table above are gases and two are liquids at room temperature. State which compounds are liquid at room temperature.



**13.** Hexane and ethanol are two colourless liquids. Compare the chemical and physical properties of these two compounds, and use this comparison to describe how to **safely** distinguish between these two liquids.

**14.** Name TWO organic compounds in the table below that are **insoluble** in water



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